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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/791,048

03/02/2004

Juan Landeros

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08/09/2006

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EXAMINER

SEMENENKO, YURIY

ART UNIT

PAPER NUMBER

2841

DATE MAILED: 08/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/791,048

Applicant(s)

LANDEROS ET AL.

Examiner

Yuriy Semenenko

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06/072006.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 29-46 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-10 and 29-46 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 02 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Amendment filed on 06/07/2006 has been entered.
In response to the Office Action dated 04/19/ 2006, Applicants have amended claim 41.
Claims 1-10 and 29-46 are now pending in the application.

Claims

- 2.1. In response to Applicant's question why the cover sheet of the Office action indicated that Specification was objected Examiner states that claim 41 is objected but claims are a part of the Specification (See 35 U.S.C. 112. Specification).
- 2.2. Claim 41 amendments accordingly with examiner's objection, are considered and is acknowledged. The claims amendments are approved.

Response to Arguments

3. Applicant's arguments filed 06/07/2006 have been considered but they are not persuasive.
- 3.1. Examiner agree with Applicant that an obtuse angle is greater than a right angle, (exceed 90 degrees (not 91^0)) but less than 180 degrees (not 179^0), it is why claim should especially point it out what kind of the angle (interior or exterior or obtuse and so on) is meant by Applicant.
- 3.2. Applicant argues with respect to independent claim 1, 31 and 41 that the Office has not provided a motivation to combine the references. In response to Applicant's argument, the Examiner recognizes that references cannot be arbitrarily combined and that there must be some reason why one skilled in the art would be motivated to make the proposed combination of primary and secondary references. In re Nomiya, 184

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USPQ 607 (CCPA 1975). However, there is no requirement that a motivation to make the modification be expressly articulated. The test for combining references is what the combination of disclosures taken as a whole would suggest to one of ordinary skill on the art. In re McLaughlin, 170 USPQ 209 (CCPA 1971). References are evaluated by what specific disclosures. In re Bozek, 163 USPQ 545 (CCPA) 1969. In this case, Akram's reference teaches motivation to combine – "...such a configuration would result in the benefit of void-free underfill (column 3, lines 14-16)"- (see OA, page 5).

3.3. In response to applicant's arguments with respect to dependent claims 2, 4-6, 29, 30, 32-36 and 41-46 and 7, 8, 37 and 38 against the references individually, Applicant cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4.1. Claim 44 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claim 44: Unclear what is an angles are including in the range from about 179⁰ to about 91⁰. Particularly unclear does include this range angels 180⁰ and 90⁰.

Examiner assumes that such reading range includes angels 180⁰ and 90⁰.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5.1. Claims 1, 3 and 31 are rejected under 35U.S.C. 103(a) as being unpatentable over Juskey et al. (Patent # 6356453) hereinafter Juskey in view of Akram (Patent # 6048656) hereinafter Akram.

As to claim 1: Juskey discloses in Fig. 8 an article 600 comprising: a mounting substrate 512; a passive component site 518 on the mounting substrate; an active component site 519 on the mounting substrate,

except, Juskey does not teach a fluid flow barrier disposed local to the passive component site and spaced apart from the active component site.

Akram discloses in Fig. 2 a fluid flow barrier 125 disposed on substrate 100.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention a fluid flow barrier disposed local to the passive component site and spaced apart from the active

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component site, as taught by Akram because Akram teaches that such a configuration would result in the benefit of void-free underfill .

As to claim 31: Juskey discloses in Fig. 8 an article 600 comprising: a mounting substrate 512; a first component site 518 on the mounting substrate; an second component site 519 on the mounting substrate,

except, Juskey does not teach a fluid flow barrier disposed local to the first component site and spaced apart from the second component site.

Akram discloses in Fig. 2 a fluid flow barrier 125 disposed on substrate 100.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention a fluid flow barrier disposed local to the first component site and spaced apart from the second component site, as taught by Akram because Akram teaches that such a configuration would result in the benefit of void-free underfill (column 3, lines 14-16).

As to claim 3: Juskey discloses the article having all of the claimed features as discussed above with respect claim 1,

except, Juskey does not teach the fluid flow barrier includes a sidewall and a floor, wherein the floor includes an electrically conductive material.

Akram discloses in Fig. 2 a fluid flow barrier 125 disposed on substrate 100. The fluid flow barrier 125 includes the sidewall. Floor of the fluid flow barrier is substrate 100, which includes conductive material (column 4, lines 50-56)

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention the fluid flow barrier includes a sidewall and a floor, wherein the floor includes an electrically conductive material to provide circuitry on surface of the substrate.

5.2. Claims 2, 4-6, 29, 30, 32-36 and 41-46 are rejected under 35U.S.C. 103(a) as being unpatentable over Juskey in view of Akram and in view of Tang et al. (Patent #6291264) hereinafter Tang .

As to claim 2 and 32: Juskey discloses the article having all of the claimed features as discussed above with respect claim 1 (31), the mounting substrate 512, Fig. including a first side 610U and a second side 610L, wherein the passive component site 518 and the active component site 519 are disposed in a solder mask 520 on the first side 610U, except, Juskey does not teach the fluid flow barrier is integral with the solder mask.

Tang discloses in Fig. 1E the fluid flow barrier 20 is integral with the mask layer (column 3, lines 21-35).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention the fluid flow barrier is integral with the solder mask to provide desired structure for underfill process.

As to claim 33: Juskey discloses the article having all of the claimed features as discussed above with respect claim 31,

except, Juskey does not teach the fluid flow barrier includes a sidewall and a floor, wherein the floor includes an electrically conductive material.

Tang discloses in Fig. 2 the fluid flow barrier includes a sidewall 20' and a floor 1', wherein the floor includes an electrically conductive material. Floor of the trench is substrate of the semiconductor chip 1, which inherently includes conductive material (column 3, lines 8-12).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention the fluid flow barrier includes a sidewall and a floor, wherein the floor includes an electrically conductive material to provide circuitry on the surface of the substrate.

As to claim 4 and 34: Juskey discloses the article having all of the claimed features as discussed above with respect claim 1(31), the mounting substrate 512, Fig. 8 including a first side 610U and a second side 610L, wherein the passive component site 518 and the active component site 519 are disposed in a solder mask 520 on the first side 610U,

except, Juskey does not teach the fluid flow barrier is a trench in the solder mask, and wherein the trench describes a perimeter around the passive component site.

Tang discloses in Fig. 3 the fluid flow barrier is a trench 20' in the solder mask, and wherein the trench describes a perimeter around the component site.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention the fluid flow barrier is a trench in the solder mask, and wherein the trench describes a perimeter around component site as taught by Tang because Tang teaches dispensed resin would be confined by the groove structure (column 4, lines 54-57)

Although, Tang does not teach a perimeter around the passive component site, it would have been obvious to one having ordinary skill in the art the time the invention was made to have the trench describes a perimeter around passive component site instead of active component site as described Tang's invention as matter of obvious engineering choice. In re Larson, 144 USPTQ 347 (CCPA 1965); In re Lockart, 90 USPQ 214 (CCPA 1951).

As to claims 5 and 35: Juskey discloses the article having all of the claimed features as discussed above with respect claims 1(31) and 4(34),

except, Juskey does not teach the perimeter includes a trench side that is adjacent and spaced apart from the active component site, and wherein the trench side that is adjacent and spaced apart from the active component site includes a non-linear boundary.

Tang discloses in Fig. 3 the perimeter includes a trench side 20' that is adjacent and spaced apart from the active component site 100', and includes a non-linear boundary (at each corner of the trench).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention the perimeter includes a trench side that is adjacent and spaced apart from the active component site, and wherein the trench side that is adjacent and spaced apart from the active component

site includes a non-linear boundary, as taught by Tang because Tang teaches dispensed resin would be confined by the groove structure (column 4, lines 54-57).

As to claims 6 and 36: Juskey discloses the article having all of the claimed features as discussed above with respect claims 1(31) and 5 (36),

except, Juskey does not teach the non-linear boundary is selected from curvilinear, rectilinear, and combinations thereof.

Tang discloses as shown in Fig. 3 teach the non-linear boundary is rectilinear.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention the non-linear boundary is rectilinear thereof to make room for another components.

As to claim 41: Juskey discloses in Fig. 8 an article 600 comprising: a mounting substrate 512 including a first side 610U and a second side 610L, a first component site 518 on the mounting substrate; a second component site 519 on the mounting substrate; wherein the first component site 518 and the second component site 519 are disposed in a solder mask 520 on the first side 610U,

except, Juskey does not teach the fluid flow barrier is integral with the solder mask.

Tang discloses in Fig. 1E the fluid flow barrier 20 is integral with the mask layer (column 3, lines 21-35).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention the fluid flow barrier is integral with the solder mask to provide room for underfill.

Juskey also fail to teach a fluid flow barrier disposed local to the first component site and spaced apart from the second component site.

Tang discloses in Fig. 3 the perimeter includes a trench side 20' that is adjacent and spaced apart from the active component site 100'.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention a fluid flow barrier

disposed local to the first component site and spaced apart from the second component site, as taught by Tang because Tang teaches dispensed resin would be confined by the groove structure (column 4, lines 54-57).

As to claims 42 and 44: Juskey discloses the article having all of the claimed features as discussed above with respect claim 41, wherein the perimeter includes a trench side that is adjacent and spaced apart from the second component site, wherein the trench side that is adjacent and spaced apart from the second component site includes a non-linear boundary, and wherein the non-linear boundary is selected from curvilinear, rectilinear, and combinations thereof,

except, Juskey does not teach the fluid flow barrier is a trench in the solder mask, and wherein the trench describes a perimeter around the first component site, the perimeter includes a trench side that is adjacent and spaced apart from the second component site, and wherein the trench side that is adjacent and spaced apart from the second component site includes a non-linear boundary and wherein the non-linear boundary is selected from curvilinear, rectilinear, and combinations thereof and a non-linear boundary including an angle, and wherein the angle is in a range from about 179° to about 91° .

Tang discloses in Fig. 3 the fluid flow barrier is a trench 20' in the solder mask, and wherein the trench describes a perimeter around the first component site 100', the perimeter includes a trench side 20' that is adjacent and spaced apart from the second component site 21, and wherein the trench side includes a non-linear boundary (at each corner of the trench) and wherein the non-linear boundary is selected from curvilinear, rectilinear, and combinations thereof, a non-linear boundary including an angle, and wherein the angle is in a range from about 179° to about 91° , as shown Fig. 3.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention the fluid flow barrier is a trench in the solder mask, and wherein the trench describes a perimeter around the first component site the perimeter includes a trench side that is adjacent and spaced apart

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from the second component site, and wherein the trench side that is adjacent and spaced apart from the active component site includes a non-linear boundary and wherein the non-linear boundary is selected from curvilinear, rectilinear, and combinations thereof, and a non-linear boundary including an angle, and wherein the angle is in a range from about 179° to about 91° , as taught by Tang because Tang teaches dispensed resin would be confined by the groove structure (column 4, lines 54-57).

As to claim 43: Juskey discloses the article having all of the claimed features as discussed above with respect claim 41 and 42, wherein the non-linear boundary is selected from curvilinear, rectilinear, and combinations thereof,

Although, Juskey does not explicitly teach the non-linear boundary is composite of rectilinear segments and curvilinear segments, at time the invention was made, it was old and well-known to use the non-linear boundary is composite of rectilinear segments and curvilinear segments. This shape is one of many known shape for the non-linear boundary. Sometimes this shape depends on technology process of making this trench (boundary). Tang discloses in Fig. 3 a non-linear boundary (at each corner of the trench) and this non-linear boundary is selected from curvilinear, rectilinear, and combinations thereof is just one of many shape. And further, it has been held In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) that change in shape and change in size of the configuration of the claimed device was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container was significant.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention the non-linear boundary is composite of rectilinear segments and curvilinear segments, as taught by Tang because Tang teaches dispensed resin would be confined by the groove structure (column 4, lines 54-57).

As to claims 29 and 45: Juskey discloses the article having all of the claimed features as discussed above with respect claim 41. Further, the first component site 519, Fig. 7 is one of a plurality of first component sites (column 11, lines 15-20) and passive component site 518 is one of a plurality of passive component sites (column 11, lines 15-20).

As to claims 30 and 46: Juskey discloses the article having all of the claimed features as discussed above with respect claim 1 (41), wherein the passive component site 518 is one of a plurality of passive component sites (column 11, lines 15-20), and the first component site 519, Fig. 7 is one of a plurality of first component sites (column 11, lines 15-20).

except, Juskey does not teach at least one fluid flow barrier presents a non-linear boundary toward the active component site and at least one fluid flow barrier presents a non-linear boundary toward the second component site.

Tang discloses in Fig. 3 fluid flow barrier 20' presents a non-linear boundary toward the component site 21' (a non-linear boundary at each corner of the trench, Fig. 3)

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention at least one fluid flow barrier presents a non-linear boundary toward the active component site and at least one fluid flow barrier presents a non-linear boundary toward the second component site, as taught by Tang because Tang teaches dispensed resin would be confined by the groove structure (column 4, lines 54-57)

5.3. Claims 9 and 39 are rejected under 35U.S.C. 103(a) as being unpatentable over Juskey in view of Akram and in view of Tang and in view of Chason et al. (PGPub #2004/0118599).

As to claim 9 and 39: Juskey discloses the article having all of the claimed features as discussed above with respect claim 1(31), further including at least one fluid flow barrier

that is disposed general to the active component site.

except, Juskey does not teach further including at least one fluid flow barrier that is disposed general to the active component site.

Tang discloses in Fig. 3 the fluid flow barrier is a trench 20' that is disposed general to the active component site.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention including at least one fluid flow barrier that is disposed general to the active component site, as taught by Tang because Tang teaches dispensed resin would be confined by the groove structure (column 4, lines 54-57)

Although, Tang teaches only one a fluid flow barrier that is disposed general to the active component site and does not teach another a fluid flow barrier it would have been obvious to one having ordinary skill in the art the time the invention was made same fluid flow barriers around another electrical components. Chason discloses design with openings of the underfill around different components 464, 460C and 460b, Fig. 4. And further, It has been held that a mere duplication of parts, absent new or unexpected results, is within the level of ordinary skill. In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960). In re Larson, 144 USPTQ 347 (CCPA 1965); In re Lockart, 90 USPQ 214 (CCPA 1951). (Although the reference did not disclose a plurality of ribs, the court held that mere duplication of parts has no patentable significance unless a new and unexpected result is produced.).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention further including at least one fluid flow barrier that is disposed general to the active component site, as taught by Tang because Tang teaches dispensed resin would be confined by the groove structure (column 4, lines 54-57).

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

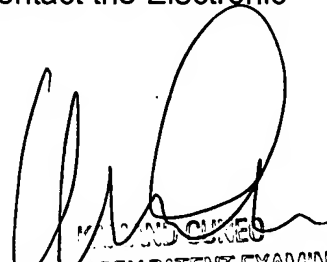
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7.1. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yuriy Semenenko whose telephone number is (571) 272-6106. The examiner can normally be reached on 8:30am - 5:00pm.

7.2. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571)- 272-1957. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

7.3. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

YS



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